REMARKS

Claims 2 and 17 are pending in this application. By this Amendment, claims 2 and 17 are amended, and claims 5, 8 and 14 are canceled. Support for the amendments to claims 2 and 17 may be found, for example, at p. 18, line 22 - p. 19, line 1, and p. 109, lines 6-14, of the originally filed specification. No new matter is added.

Entry of the amendments is proper under 37 CFR §1.116 because the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issue requiring further search and/or consideration as the amendments amplify issues previously discussed throughout prosecution; (c) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (d) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary and were not earlier presented because they are made in response to arguments raised in the final rejection. Entry of the amendments is thus respectfully requested.

I. Rejection Under 35 U.S.C. §102/§103

The Office Action rejects claims 2 and 5 under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. Patent Application Publication No. 2003/0035999 to Gao et al. ("Gao"). By this Amendment, claim 5 is canceled, rendering its rejection moot. As to the remaining claim, Applicants respectfully traverse the rejection.

Gao does not anticipate claim 2 and would not have rendered claim 2 obvious for at least the following reasons. As amended, claim 2 includes the features of canceled claim 5. Claim 2 now recites "wherein an existence ratio of zirconium and magnesium is respectively 20% or more on a surface of the lithium-transition metal composite oxide and at least a part of the zirconium on said surface is present as lithium zirconate." Gao does not disclose, teach, or suggest at least these claimed features.

Gao does not teach or suggest zirconium and magnesium existing on the surface of the positive electrode active material at the same time. Gao describes a preferred composition represented by the formula $LiNi_{1-y}Co_aM^3_bM^4_cO_2$ (M^3 is selected from the group consisting of Ti, Zr, and combinations thereof, and M^4 is selected from the group consisting of Mg, Ca, Sr, Ba and combinations thereof). Furthermore, Gao teaches that $LiNi_{0.7}Co_{0.1}Ti_{0.1}Mg_{0.1}O_2$, $LiNi_{0.75}Co_{0.15}Ti_{0.05}Mg_{0.05}O_2$ and $LiNi_{0.7}Co_{0.2}Ti_{0.05}Mg_{0.05}O_2$ are more preferable. See Gao at paragraph [0022]. $LiNi_{1-y}Co_aM^3_bM^4_cO_2$ is a composition that may include zirconium and magnesium independently, but as can be seen from the more preferable compositions, there is no description of a combination including both zirconium and magnesium. Thus, Gao does not teach or suggest "an existence ratio of zirconium and magnesium," as claimed.

Additionally, Gao does not teach or suggest "an existence ratio of zirconium and magnesium is respectively 20% or more on a surface of the lithium-transition metal composite oxide," as claimed.

As the present specification describes, a precipitation method is necessary in order to achieve the claimed existence ratio of zirconium and magnesium. An alkali aqueous solution, such as sodium hydroxide, is added dropwise to an aqueous solution comprising cobalt ions and ions of the surface elements (magnesium and zirconium) at a predetermined compositional ratio to precipitate a composite metal salt of cobalt, zirconium and magnesium. The solution is then filtered to extract the composite metal salt, which is then washed with water, heat-treated, and further mixed with a lithium compound to obtain a starting material mixture. Then, the mixture is calcinated at a temperature between 650-1200° C, and pulverized, if necessary, to obtain the positive electrode material. See specification at p. 49, line 1- p.50, line 16. By integrating these steps, one can achieve "an existence ratio of zirconium and magnesium is respectively 20% or more on a surface of the lithium-transition metal composite oxide," as claimed.

One of ordinary skill in the art would not have had any reason or rational to develop a positive electrode active material for a nonaqueous electrolyte secondary battery wherein an existence ratio of zirconium and magnesium is respectively 20% or more on a surface of the lithium-transition metal composite oxide with Gao's disclosure. Gao describes producing a positive electrode active material having a separate phase by varying the calcinations (firing) temperature when calcinating the starting material mixture. See Gao at paragraph [0011]. The starting material mixture is obtained by mixing the material of lithium-transition metal composite oxide with the compound of elements of the separate phase, such as titanium or zirconium, by a dry-mixing method. Gao's examples only describe preparing the starting material mixture by dry mixing magnesium and an element of a separate phase, such as titanium, with other materials. Although Gao briefly mentions a precipitation method at paragraph [0031], Gao does not describe employing the precipitation method in any example. Consequently, one of ordinary skill in the art would have had no reason or rationale to have employed the precipitation method and, thus, obtain the claimed existence ratio.

Moreover, the existence ratio of magnesium on the surface does not become a high ratio of 20% or more when magnesium is obtained by dry mixing. For example, Examples 1-4 and 1-5, in the present specification, show that dry mixing magnesium provides a low existence ratio of magnesium, respectively 6% and 4%. See specification at page 91, lines 7-22.

On the other hand, if titanium were replaced by zirconium in Gao's examples, the resulting existence ratio of the surface elements would still not equal the claimed existence ratio. For example, Example 1-1 (precipitating zirconium) and Comparative Example 1-1 (dry mixing zirconium), show existence ratios of zirconium of 98.3% and 12.8%, respectively. See specification at page 87, lines 5-12 and page 88, lines 3-8.

As discussed above, Gao describes that both dry mixing and precipitation are applicable, but does not select the precipitation method, and provides no reason or rational to use a precipitation method. Thus, the existence ratio of the surface elements of Gao would differ considerably from that of the claimed invention.

Furthermore, when an existence ratio of zirconium and magnesium is respectively 20% or more on a surface of the lithium-transition metal composite oxide, as claimed, the secondary battery produces unexpected results over the applied reference. Batteries having the claimed positive electrode active material have excellent initial discharge capacity, load discharge capacity, cycle characteristics and thermal stability.

Table 5 of the present specification compares Example 4-1 (precipitating zirconium and magnesium) with Examples 1-4 and 1-5 (add magnesium after precipitating zirconium). See specification at p. 110. Example 4-1 had an existence ratio of surface elements within the claimed existence range (Zr 32%, Mg 73%). On the other hand, Example 1-4 (Zr 51%, Mg 6%) and Example 1-5 (Zr 55%, Mg 4%) did not fall within the claimed existence ratio. Moreover, Table 5 shows that the heating starting temperature (thermal stability) of Example 4-1 is higher than that of Example 1-4 and Example 1-5. Thus, the positive electrode active material having an "existence ratio of zirconium and magnesium is respectively 20% or more on a surface of the lithium-transition metal composite oxide," provides unexpected results over Gao.

Gao does not teach or suggest each and every feature of claim 2, at least because Gao does not disclose the claimed feature of "an existence ratio of zirconium and maganesium is respectively 20% or more," as claimed. Thus, claim 2 is not anticipated by Gao. Moreover, claim 2 would not have rendered obvious by Gao at least because Gao does not provide any reason or rationale to develop the claimed positive electrode active material, and the claimed

positive electrode active material provides unexpected results over Gao. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

II. Rejections Under 35 U.S.C. §103

The Office Action rejects claims 8, 14 and 17 under 35 U.S.C. §103(a) over Gao in view of U.S. Patent Application Publication No. 2002/0127473 to Ooya et al. ("Ooya"). By this Amendment, claims 8 and 14 are canceled, rendering their rejection moot. As to the remaining claim, Applicants respectfully traverse the rejection.

As discussed above, by this Amendment, claim 2 is amended to recite "an existence ratio of zirconium and magnesium is respectively 20% or more on a surface of the lithium-transition metal composite oxide." Gao does not disclose, teach or suggest at least this claimed feature. Thus, claim 2 is not anticipated by Gao and would not have been rendered obvious by Gao. Ooya fails to cure these deficiencies.

Ooya does not teach or suggest, or provide any reason or rationale for one of ordinary skill in the art to develop a positive electrode active material for a nonacqueous electrolyte secondary battery wherein "an existence ratio of zirconium and magnesium is respectively 20% or more on a surface of the lithium-transition metal composite oxide," as recited in claim 2.

Thus, claim 2 would not have been rendered obvious by Gao and Ooya, alone or in combination. Claim 17 depends from claim 2 and, thus, also would not have been rendered obvious by Gao and Ooya. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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JAO:ABF/pjw

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